

AMENDMENTS TO THE CLAIMS

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of Claims:

1. (Currently Amended) A droplet ejector, comprising:  
a fluid path through which a fluid moves, a nozzle being formed on one end of the fluid path;  
a volumetric structure having a predetermined volumetric size, the predetermined volumetric size being contained entirely within the fluid path, the volumetric structure being sensitive to an external stimulus and being capable of varying the predetermined volumetric size in at least two directions simultaneously to eject a droplet of the fluid through the nozzle;  
and embed  
a stimulus generator configured to generate and apply the stimulus to the volumetric structure to vary the predetermined volumetric size of the volumetric structure and to remove the stimulus to adjust the volumetric structure to the predetermined volumetric size, wherein the droplet ejector is configured to eject the droplet of fluid upon application of the stimulus.
2. (Original) The droplet ejector as claimed in claim 1, wherein the volumetric structure expands in size to eject the droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to expand the size of the volumetric structure.
3. (Original) The droplet ejector as claimed in claim 2, wherein the volumetric structure is formed of stimulus sensitive hydrogel.

4. (Original) The droplet ejector as claimed in claim 3, wherein the stimulus sensitive hydrogel is electrical field sensitive hydrogel.
  
5. (Previously Presented) The droplet ejector as claimed in claim 1, wherein the fluid path comprises:  
a chamber, which is filled with the fluid to be ejected and is formed under the nozzle;  
and  
a channel for supplying the fluid to the chamber,  
wherein the volumetric structure is formed in the chamber.
  
6. (Original) The droplet ejector as claimed in claim 5, wherein the volumetric structure has a columnar shape, a hexahedral shape, or a cylindrical shape.
  
7. (Original) The droplet ejector as claimed in claim 5, wherein the stimulus generator is a pair of electrodes respectively disposed above and below the volumetric structure.
  
8. (Previously Presented) The droplet ejector as claimed in claim 36, wherein the stimulus generator includes a pair of electrodes, one of the pair of electrodes being a cathode,  
the volumetric structure is an electrical field sensitive hydrogel that varies in volume towards the cathode first, and  
the cathode is disposed between the volumetric structure and the nozzle.

9. (Withdrawn) The droplet ejector as claimed in claim 5, wherein the stimulus generator is a pair of electrodes respectively disposed at either side of the volumetric structure.

10. (Withdrawn) The droplet ejector as claimed in claim 1, wherein the volumetric structure contracts in size to eject the droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to contract the size of the volumetric structure.

11. (Withdrawn) The droplet ejector as claimed in claim 10, wherein the volumetric structure is formed of stimulus sensitive hydrogel.

12. (Withdrawn) The droplet ejector as claimed in claim 11, wherein the stimulus sensitive hydrogel is temperature sensitive hydrogel.

13. (Withdrawn) The droplet ejector as claimed in claim 12, wherein the stimulus generator is a resistance heating material for applying heat to the volumetric structure.

14. (Withdrawn) The droplet ejector as claimed in claim 13, wherein the fluid path comprises:

a chamber, which is filled with the fluid to be ejected and is formed under the nozzle;

and

a channel for supplying the fluid to the chamber.

15. (Withdrawn) The droplet ejector as claimed in claim 14, wherein the volumetric structure is formed in the channel.

16. (Withdrawn) The droplet ejector as claimed in claim 15, wherein the volumetric structure has a columnar shape or a hexahedral shape.

17. (Withdrawn) The droplet ejector as claimed in claim 14, wherein the volumetric structure is formed in the nozzle.

18. (Withdrawn) The droplet ejector as claimed in claim 14, wherein the volumetric structure is formed in the chamber.

19. (Currently Amended) An ink-jet printhead, comprising:  
a manifold on a substrate;  
a barrier layer on the substrate;  
a nozzle plate on the barrier layer, the nozzle plate including a nozzle;  
an ink chamber between the barrier layer and the nozzle plate;  
an ink channel on the barrier layer and in communication with the ink chamber and the manifold;

a volumetric structure in communication with an ink flow, the volumetric structure being sensitive to an external stimulus and being capable of varying in size to eject the ink droplet through the nozzle, the volumetric structure being formed of stimulus sensitive hydrogel; and

a stimulus generator, which applies a stimulus to the volumetric structure to vary a size of the volumetric structure.

20. (Original) The ink-jet printhead as claimed in claim 19, wherein the volumetric structure expands in size to eject the ink droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to expand the size of the volumetric structure.

21. (Cancelled)

22. (Currently Amended) The ink-jet printhead as claimed in claim ~~[[21]]~~ 20, wherein the stimulus sensitive hydrogel is electrical field sensitive hydrogel.

23. (Original) The ink-jet printhead as claimed in claim 22, wherein the volumetric structure is formed in the ink chamber.

24. (Original) The ink-jet printhead as claimed in claim 23, wherein the volumetric structure has a columnar shape, a hexahedral shape, or a cylindrical shape.

25. (Original) The ink-jet printhead as claimed in claim 23, wherein the stimulus generator is a pair of electrodes respectively disposed above and below the volumetric structure.

26. (Original) The ink-jet printhead as claimed in claim 25, wherein one of the pair of electrodes is a cathode and is disposed above the volumetric structure.

27. (Withdrawn) The ink-jet printhead as claimed in claim 23, wherein the stimulus generator is a pair of electrodes respectively disposed at either side of the volumetric structure.

28. (Withdrawn) The ink-jet printhead as claimed in claim 19, wherein the volumetric structure contracts in size to eject the ink droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to contract the size of the volumetric structure.

29. (Cancelled)

30. (Withdrawn –Currently Amended) The ink-jet printhead as claimed in claim [[29]] 28, wherein the stimulus sensitive hydrogel is temperature sensitive hydrogel.

31. (Withdrawn) The ink-jet printhead as claimed in claim 30, wherein the stimulus generator is a resistance heating material for applying heat to the volumetric structure.

32. (Withdrawn) The ink-jet printhead as claimed in claim 31, wherein the volumetric structure is formed in the ink channel.

33. (Withdrawn) The ink-jet printhead as claimed in claim 32, wherein the volumetric structure has a columnar shape or a hexahedral shape.

34. (Withdrawn) The ink-jet printhead as claimed in claim 31, wherein the volumetric structure is formed in the nozzle.

35. (Withdrawn) The ink-jet printhead as claimed in claim 31, wherein the volumetric structure is formed in the ink chamber.

36. (Previously Presented) The droplet ejector as claimed in claim 1, wherein the volumetric structure exhibits a non-isotropic variation in size upon application of the stimulus.

37. (Previously Presented) The droplet ejector as claimed in claim 1, wherein the volumetric structure is on a surface that defines a portion of the fluid path, and the two directions are orthogonal to each other.

38. (Previously Presented) The droplet ejector as claimed in claim 37, wherein the volumetric structure has a first end disposed on the surface that defines a portion of the fluid path, a second end opposite to the first end and a side portion connecting the first and second ends, and wherein the side portion and the second end are exposed to the fluid.

39. (Previously Presented) The droplet ejector as claimed in claim 1, wherein the volumetric structure is configured to expand to a size greater than its original size.

40. (Previously Presented) The droplet ejector as claimed in claim 1, wherein the volumetric structure is configured to contract to its original size.